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ABSTRACT

A specifically designed nature trail can provide enjoyable and relaxed outdoor learning, greater independence and self-direction, and an awareness of the dynamic outside world to the physically, mentally, and multiply hardicapped. The trail proposed for the Russell Forest Preserve near Genoa, Illinois, is designed in two loops and features a demonstration center and study areas for birds, bark, vegetation, a river, and civilization. The trail may be used for environmental education by developing general or specific interests and providing learning experiences based on major themes such as environmental awareness, interpretation of the natural environment, appreciation of natural beauty, and language development. Design specifications must focus on easy access to the facility. Adequate right of way, proper drainage, non-slip surfaces, and a 5% grade with smooth transitions between levels are general elements of facilities for the handicapped. Plans for parking facilities, drop curbs, ramps, doors, toilets, telephones, food service, and information and educational materials must all take into consideration those in wheelchairs, those who walk with difficulty, the deaf, and the blind. Provisions for the blind can include tape recorders, braille signs and slates, natural objects to touch, chimes to signal turns, and special arts and crafts. (SB)

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TAFT CAMPUS OCCASIONAL PAPER NO. XIII

# A NATURE TRAIL FOR THE HANDICAPPED

Prepared by
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This paper was prepared for Natural Resources Education-Demonstration Center, Genoa, Illinois.

[1970]

Taft Campus Occasional Papers provide a means of sharing professional documents prepared primarily in connection with the on-going program in the Department of Outdoor Teacher Education, Northern Illinois University, but which may be more useful if given a wider distribution.

## Preface

The report A Nature Trail for the Handicapped was prepared for the DeKalb County Natural Resources Education-Demonstration Center. The purpose of the report is to stimulate interest in the development of a nature trail specifically designed for the handicapped. This report was compiled by the following people:

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# A NATURE TRAIL FOR THE HANDICAPPED

## Introduction

Nature trails offer a broad range of opportunities and experiences that enhance our lives. People with disabilities have the same needs and desires for these opportunities as non-disabled persons. Participation in outdoor learning experiences along a nature trail can provide the handicapped great enjoyment and help them to strengthen their independence and self-direction.

Unfortunately, however, great numbers of disabled persons are not receiving the benefits of healthy and voluntary contact with nature. The severity of their disabilities, architectual barriers, nonacceptance by society, and slowness of the schools and others associated with outdoors education to adjust its programs and facilities to their needs all have contributed to a serious lack of opportunity.

Although we have come a long way in accepting and caring for the handicapped, especially with respect to treatment, education, and rehabilitation, there is much left that should be done in the field of out-of-classroom learning and nature study. By making nature trails available to the handicapped we can prevent them from becoming unaware of the dynamic outdoor world.

## Purpose

The purpose of a trail is to provide a pleasant and friendly way of approaching nature in a relaxed kind of informal firsthand study. A trail also constitutes a planned and fixed pathway for people to explore a given land area. These two ideas may be expressed in other ways. First, the trail may be programmed in such a way that it arouses and sustains interest and serves as a media for presenting organized information. Second, the trail is a fixed resource. It may change directions as circumstances dictate. The trail may ramble through woods and fields, over various terrain, through different habitats, but it is clearly laid out so that it can be followed easily. This fixed position of the trail gives direction and purpose to the movement of people. It tends to reduce idle rambling and may provide incentive to enjoyment and learning.

## People to be Served

The people who are to be served include men, women, and children who are handicapped.

The 1960 White House Conference on Children and Youth defined a handicapped child as one who cannot play, learn, work, or do the things other children of his age can do; or who is hindered in achieving his full physical, mental, and social potentialities because of a disability. This definition also can be applied to handicapped adults.

The handicapped are commonly thought of as living apart from society in institutions. However, a majority of them live in their own homes in the community. Some are severely disabled and are home bound. But others are not, and can easily participate in community programs when they have access to facilities.

The Physically Handicapped

There are many types of physical disabilities. Commonly identified as disabled are those who suffer from orthopedic conditions, such as amputees, paraplegics, and post-polio individuals, the blind and partially sighted, and the deaf. Most of these people are not ill, but their disabilities may keep them from fully participating in outdoor education activities.

The Mentally Retarded

Mental retardation refers to below general intellectual functioning. It is associated with impairments of maturation, learning, and social adjustment. The mentally retarded experience difficulty in ability to learn as well as in applying what is learned to everyday problems.

There are different degrees of mental retardation. These are described in the following categories:

1. The mildly retarded who are limited with respect to academic achievements, but who may attain a level of self-sufficiency as adults through special education;

2. The moderately retarded who can learn to care for personal needs, travel by themselves in their own neighborhood, and do many useful tasks in the home or sheltered environment;

3. The severely retarded who have potential for self-care, but whose economic potential is severely limited; and

4. The profoundly retarded who usually cannot become independent in eating and dressing.

The Multiple Handicapped

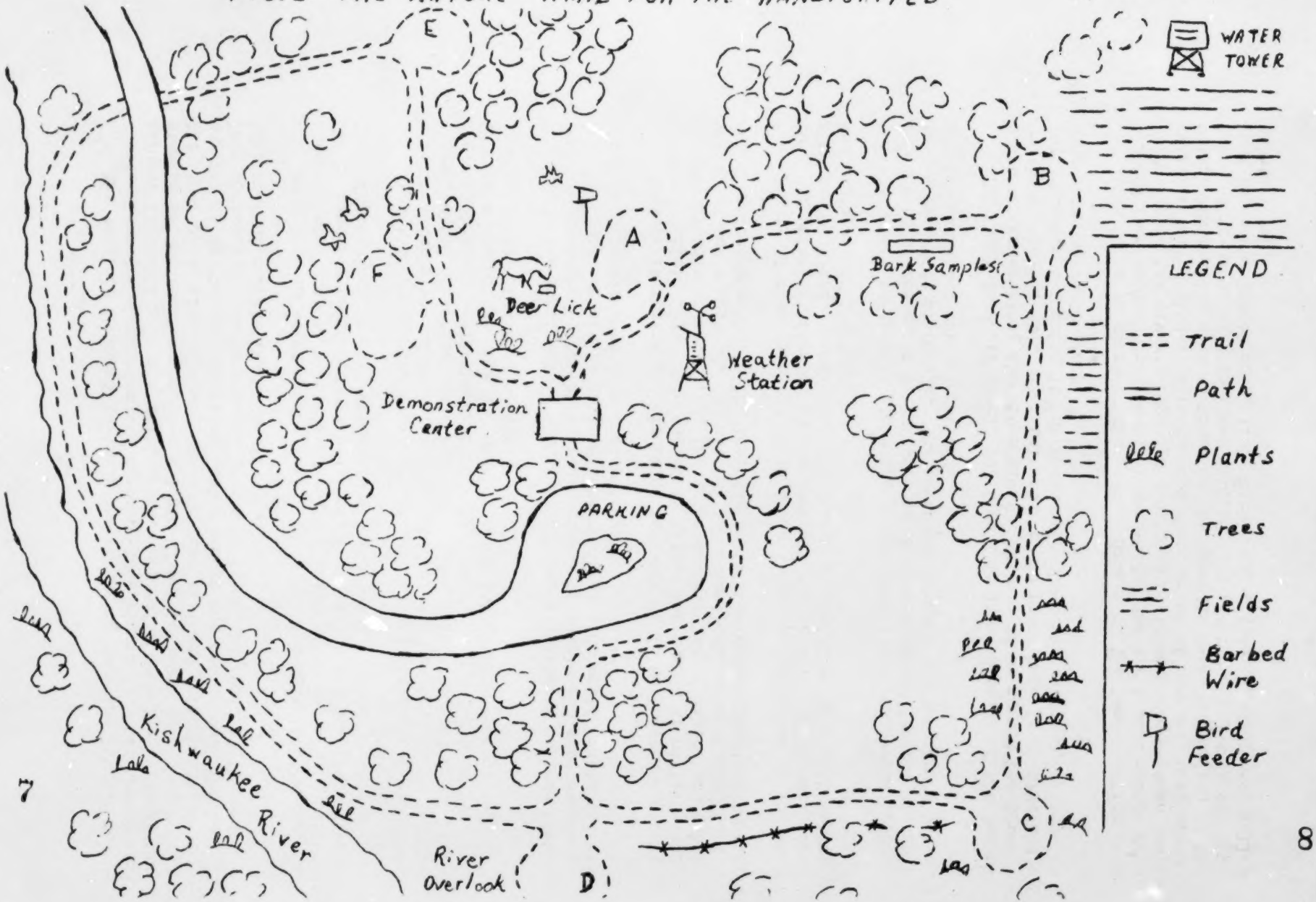
Often, the disabilities described above do not occur singly. Many individuals are afflicted with multiple handicaps. For example, a physically handicapped person may be mentally retarded.

These are the people, the physically handicapped, the mentally retarded, and the multiple handicapped, for whom this proposed nature trail is designed.

## The Nature Trail for the Handicapped

The proposed nature trail for the handicapped is to be located in Russell Forest Preserve on Route 64 east of Genoa, Illinois. The trail is to be operated and supervised by the Natural Resources Education-Demonstration Center under the direction of Mrs. Beverly Southern.

FIG. 2 THE NATURE TRAIL FOR THE HANDICAPPED

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The trail is designed in two loops extending from the Natural Resources Education-Demonstration Center. (See Figure 1) This arrangement affords flexibility in its utilization. Depending upon the interest and stamina of the handicapped, Loops I and II may be taken in sequence. On the other hand, if people are tired or need rest and refreshment, they may return to the Demonstration Center before continuing on. The two loop system also allows several groups to be on the trail at the same time without conflicting with one another.

Loop I is to start at the North end of the Demonstration Center. A turn-off circle is to be situated east of the birding area (A). Turn-offs may be used for prolonged observations, for setting the tone, for reviewing and planning, or for just plain sitting and listening.

From this point, the trail swings east toward the fence line. This area is thickly wooded containing various forms of vegetation including: cherry, white oak, black oak, red oak, linden, elm, ash, bitternut hickory, prickly ash or toothache bush, virginia creeper and poison ivy. This is an excellent area in which to build and develop concepts of growth, decay, food chains, etc.

Bordering the trail in this section, sample slabs of various bark would be displayed with the corresponding leaf sample and seed sample in relief. These specially devised instructional aids would enable the blind to perceive some tree characteristics tactilly.

Another listening and observing turn-off is to be located adjacent to the cornfield (B). Here one could listen for sounds of civilization, observe symbols of man, i.e., the water tower in the distance and cultivation of the cornfield. An attempt to estimate the size of the field could be incorporated in the learning activities planned at this turn-off.

The trail then proceeds south along the property border to the next turn-off which is situated at the property corner (C). Along this portion of the trail, one may observe fringe area plants, tree silhouettes and man's use of the land.

The trail turns east along the south fence line. One could bring out the significance of barbed wire as an invention and its relationship to the community of DeKalb. The hawthorne orchard and low shrubs here provide excellent cover for birds.

The final turn-off circle for Loop I is located south of the Demonstration Center along the river bluff. This could be termed The River Overlook Turn-Off (D). The instructor could pause here to observe and review before returning to the Center via the south entrance, or continuing along to follow Loop II.

Loop II is to start at the south entrance of the Demonstration Center and lead to The River Overlook Turn-Off. The trail then swings down gradually to the river's edge and continues upstream. Observation possibilities here include: direction of flow, speed of current, work of water, contrasting size of trees on the opposite bank, comparison of the types of trees growing in river lowland area and those found in the upland woods and fringe area, i.e., hackberry, willow, linden, ash, yellow chestnut oak.

The trail then ascends very gradually to the curve in the road, and follows along the road edge to the top of the bank for a short distance before swinging across the road into the woods once again.

The trail proceeds approximately northeast to the Large Toothed Aspen Grove Turn-Off (E). From this point the trail proceeds south along an already cleared path to the final turn-off on Loop II situated just west of the birding area (F). Loop II then terminates at the north entrance to the Demonstration Center.

## Educational Use of the Nature Trail

A nature trail trip is more than a nature walk. It is a learning activity which involves the learner in and with experience of varying kinds: direct experience, firsthand observation, a multi-sensory approach to discovery, discovery which leads to understanding, and ultimatley understanding which leads to a more perceptive and richer individual.

The nature trail experience may be developed around general interests, specialized interests, and major themes. The general interest experiences may include recognizing and discussing plants, shrubs, trees, evidence of animals, plant succession, and geological, historical and topographical features. The specialized interest experiences emphasize special kinds of features. Examples are: geology, ecology, history, water life, insects and birds. The major theme experiences develop an awareness, interpretation, and appreciation of nature in a general way. These themes may be pursued singly or may be used in combination as many of the recommended learning experiences are interrelated.

For the purpose of illustration, four major themes are presented for use with the handicapped on the proposed nature trail. General objectives are spelled out for each theme so that the instructor or resource leader will know the goals toward which he is striving. Sample recommended learning experiences are identified. Naturally, these may be amplified, modified or expanded according to the flexibility and adaptability of the individual instructor. For example, the leader will want to adapt the experience to the age level, grade level, and achievement level of his group.

### I. Developing Environmental Awareness

A. General Objectives

1. The individual will sharpen perceptual awareness to various natural phenomena.

2. The individual will become aware of similarities and differences among living and non-living things.

3. The individual will have opportunities to improve problem solving abilities.

4. The individual will develop new concepts and build upon previously held concepts regarding the world in which we live.

B. Recommended Learning Experiences

1. Examine trees visually and tactilly noting characteristics of bark, buds, leaves, flower and fruit.

2. Observe birds for enjoyment and identification.

3. Develop auditory perception by recording and analyzing characteristics of bird songs.

4. Examine rocks to note characteristics.

5. Locate geographical direction by sun's movements.

6. Estimate distances: heights, circumference, diameter and linear measure.

7. Apply the "exploratory or discovery technique" as a method of learning about the out-of-doors.

8. Learn how to apply the steps of problem solving to find out about natural processes.

II. Interpreting the Natural Environment

A. General Objectives

1. The individual will learn to gather and interpret raw data based upon firsthand observation.

2. An individual will come to understand some of the interrelationships which exist in the natural community.

3. The individual will develop an appreciation and understanding of the need to conserve natural resources.

4. The individual will continue to improve problem solving skills.

B. Recommended Learning Experiences

1. Observe examples of erosion; recognize factors that hasten erosion or slow it down.

2. Examine soil samples, noting differences.

3. Observe examples of seasonal change among plants, animals, and the natural terrain.

4. Make weather observations.

5. Locate areas suitable for animal homes.

6. Find out what animals feed upon.

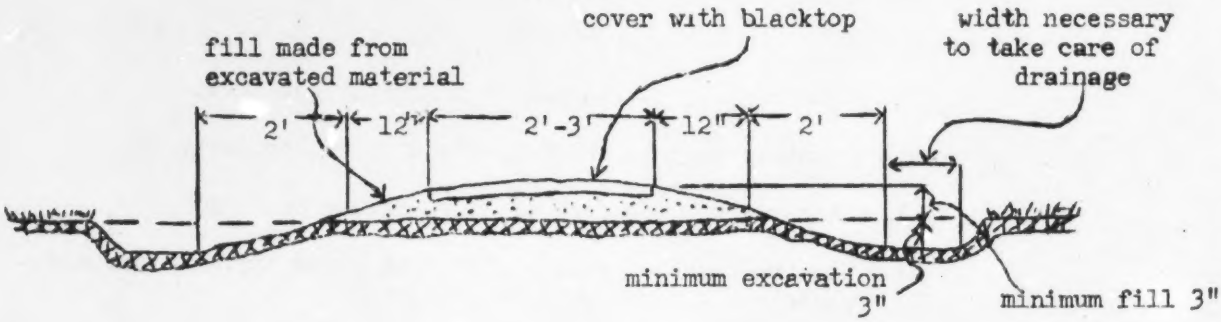


Figure 2. Design of a Built-up Trail Over a Wet Area

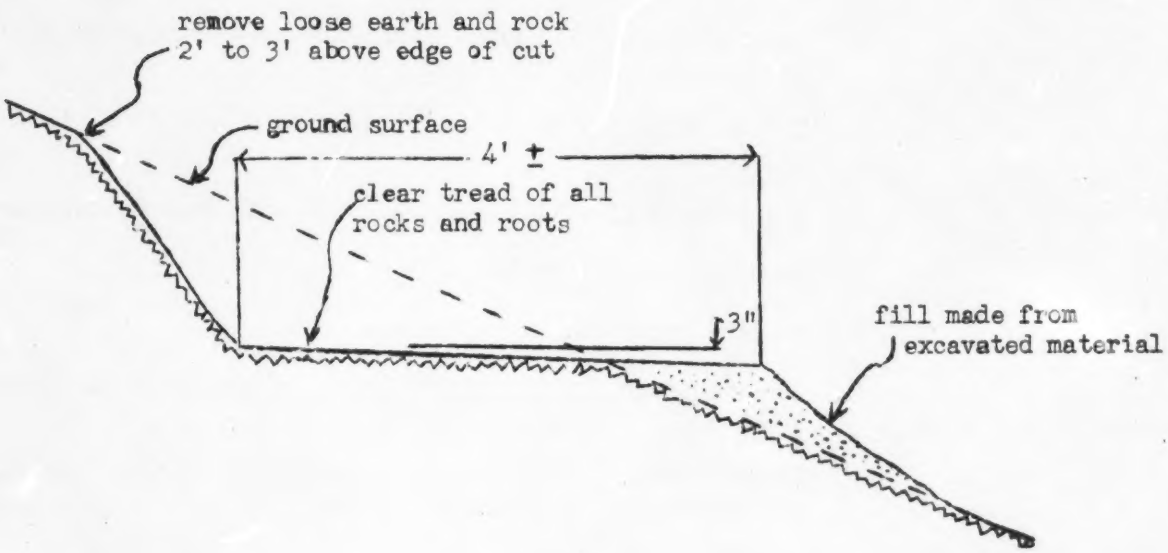


Figure 3. Trail Specifications for a Trail Along a Slope

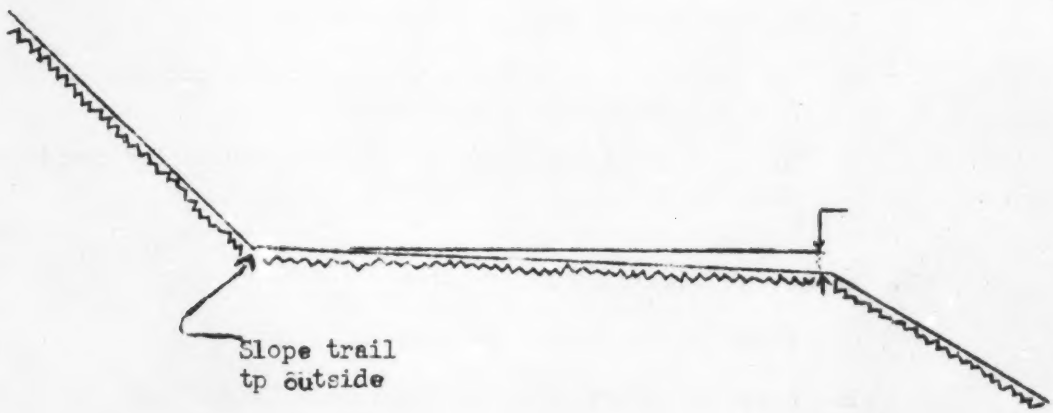


Figure 4. Trail Sloped to the Outside to Permit Run-Off

7. Compare characteristics of different habitats.

8. Identify ways in which plants disperse their seeds.

9. Discover how one form of life affects another.

10. Observe clouds: relate different cloud types to air movements and general weather patterns.

III. Appreciating Beauty in the Natural Environment

A. General Objectives

1. The individual will have opportunities to recognize beauty in a natural setting.

2. The individual will learn to perceive shape, form, texture, and color.

3. The individual will become familiar with design in nature.

B. Recommended Learning Experiences

1. Compare textures: bark, leaves, rocks.

2. Compare shape and form: roundness, squareness, thickness, thinness.

3. Compare color: living and non-living substances, wet and dry materials, sunlight and shade, etc.

IV. Fostering Language Development

A. General Objectives

1. The individual will expand vocabulary.

2. The individual will learn to use precise and graphic language in oral and written expression.

3. The individual will provide the opportunity for creative expression.

B. Recommended Learning Experiences

1. Identify and discuss various landforms.

2. Describe natural objects accurately in writing.

3. Tell about a "natural happening" based upon your own observation.

4. Write a poem based on some outdoor stimuli.

5. Write a story.

6. Express ones thoughts and feelings while in a natural setting.

In no way should the trail be viewed as a limiting factor, but rather as a vehicle for providing handicapped individuals with an opportunity to grow beyond their limitations--to grow in awareness, knowledge, understanding and appreciation.

## General Trail Construction

The type of program offered, the lay-of-the-land and the anticipated number of people using the trail will have much to do with the amount and kinds of trail construction needed. Some of the categories of construction are:

1. Right-of-Way

Where new heavy-use trails are put through dense growths of bushes, shrubs or young trees, it is desirable to clear the trail from eight to as much as fifteen feet wide. Such clearing not only encourages ferns, clovers, grasses and some flowering plants, but makes trail maintenance easier. Clearing should be to ten feet above the trail in order to allow for branches that hang down when wet from rain or laden with snow. Cut large trees only where it is impracticable to build around them. All cutting should be done very close to the ground and all stumps and rocks should be cleared from the tread area. This includes small stones and rocks.

2. Base

In preparing the base for a trail, the fundamental make-up of the ground surface and slope of the land should be considered. No particular base preparation is needed on a dry site and where the trail is laid out so that the tread does not slope.

If the site is wet, provision must be made to raise the tread three to six inches above the surrounding area. This is done by grading as illustrated in Figure 2.

Where trails run along hillsides, cuts must be made in order to achieve level treads. Figures 3 and 4 show some of the principles to observe in such cases.

3. Grade

Trails should be built to follow the contour of the land if possible. A grade of 10 per cent or less is recommended, as a general rule, but for the handicapped the preferred grade would be 5 per cent with smooth transition to upper and lower levels.

4. Drainage

Drainage is one of the most important items in trail construction, especially if the trail is heavily used or built on a steep grade. It is wise to grade the trail's tread carefully so that the outside is lower than the inside edge along a hillside to facilitate surface drainage. However, special care must be taken to assure safe travel by wheelchairs.

5. Surface

Surfacing includes a variety of materials including: wood chips, fine shale, sand and small gravel, crushed rock, blacktop and concrete.

In a general way, the building of a hard-top trail is not unlike building an improved road. The nature of the traffic to be carried and the widths are different.

The color of a blacktop trail can be changed. A tough vinyl plastic coating that can be applied to existing blacktop is available in grass green, brick red and concrete gray. The product, called Vynatex 23, can be applied by regular maintenance personnel. In addition to providing an attractive, easy-to-clean colored surface, the coating will retard oxidation, sundrying, and frost damage, thereby making a trail last longer. More information about colored surfacing for trails can be obtained from Maintenance, Inc., Wooster, Ohio.

Painted walkways are sometimes dangerous because they become slippery when wet. To overcome this difficulty, while the paint is still wet, clean washed sand is sprinkled on the surface. The sand is allowed to dry into the paint and a second coat of paint is applied and allowed to dry. This treatment of the surface affords improved traction and reduces chances of slipping.

## Special Trail Construction

A trail for the handicapped requires that special considerations be given to the planning and construction of the trail. Some of the special features of such a trail are:

1. Trail Planning

   a. Organization: Maximum access should be provided to all activities in which the handicapped might participate or be spectators.

   b. Types of Handicaps: The following types of physically handicapped should be considered:

      (1) Those confined to wheelchairs.

      (2) Those who walk with difficulty including those with braces or crutches.

(3) Those who are blind or partially sighted.

(4) Those who are deaf or hard of hearing.

(5) Those who are poorly coordinated or subject to palsy.

c. Layout: Major use areas should be connected by usable paths (see Section on Access) with frequent resting places if distance warrant. Spectator areas should be provided near interesting activities. Shelter from wind and sun should be provided at rest and spectator areas.

d. Detail Design: Structures and equipment which might be used by the handicapped should be especially adapted to such use whenever possible.

e. Information: Special signs and maps should direct wheelchair occupants and other handicapped persons to paths and facilities adapted for their use. Signs should be readable by those with impaired sight. Braille labels should be made from light-weight aluminum or with a Dymo Braille Tape Writer which is available from the American Foundation for the Blind, 15 West 16th Street, New York, New York.

Printed materials available to the sighted should be available in braille for the blind. Brailled instruction booklets about what to look for along the trail should include raised copies of leaves, flowers, bark, etc.

2. Access

a. Parking: Stalls should be made 12'-0" wide for both perpendicular and diagonal parking. Drop curbs should be provided at convenient locations for wheelchair access to walks. Avoid wheelchair circulation behind cars.

b. Walks: Should have a minimum width of 48". Walk pavement should have a hard non-slip surface of concrete, sealed asphalt, etc. Walks should blend with the adjacent ground and have a minimum gradient. Care should be taken to minimize expansion joints and expansion joint filler which expands above the walk surface. Walks which cross drives or parking areas, should blend to the level of the drive or parking area by using drop curbs. Avoid steps and sharp breaks in grade in walks.

Walks that follow the river should have a raised slope on downhill side. At crossroads and turn offs, there should be a different textured surface to facilitate locating them. Objects such as wind chimes could be located at the intersections and turn offs. A sounding device can be made from a bicycle wheel attached to a post. The wheel is rotated by wind caught in a wind cup located around the circumference of the wheel. As the wheel rotates, the spokes strike

a finger that causes them to ring. Varying the spoke tension will vary the sound to help distinguish the various crosswalks and turn offs.

c. Ramps: Should be provided for access to facilities when required by topography. Ramps should be constructed with a non-slip surface; 37" minimum width between railings, but 72" wide for two-way circulation. The maximum gradient for ramps should be 8.33%; a preferred grade would be 5%, with smooth transition to upper and lower levels. Platforms on ramps should be provided at the top and bottom, at 30' intervals, and at all changes of direction. Handrails, preferably on both sides, should be 32" high, 2" from the wall, and extending at least 12" beyond the top and bottom of the ramp.

Curbs 2" high and 4" wide made of wood or concrete should be provided under handrails and adjacent to walls to prevent wheelchair scuffing rough walls or catching railing posts.

If because of extreme site conditions, the allowable maximum gradient for ramps cannot be maintained, ramps should still be constructed as a steep ramp is less of a barrier than steps, and a second party can be called for assistance.

d. Stairs: Stairs should have riser heights of standard size (6") but without having abrupt square nosing. Steps with forward sloping risers are better for physically disabled people. Railing should be set at 32" above the tread.

e. Doors and Doorways: Doors should have a minimum clear opening of 32" (preferably 36") and should be operated by a single effort. The floor, both on the inside and outside, should be level for a distance of 5 feet. As much as possible, thresholds should be flush with the floor.

f. Door Hardware: Each door should have three hinges with kick plates 16" high. Door closers should be the time-delay type. Vertical bar type, pull handles should be placed 36" from floor with an additional pull handle placed near the hinge to enable wheelchair occupant to close the door, if door closers are not provided. Safety glass lights 6" x 42" high can be placed 28" above floor if privacy is not required. Metal edge strips 40" high should be added to protect wood door.

3. Toilet Facilities

a. Toilet stall should be 3'-0" wide, 5'-0" deep, with a door 32" wide swinging out; handrails on each side, 33" high parallel to floor; and a wall mounted water closet 20" high.

b. Urinals should be floor mounted or, if wall mounted, the opening should be no higher than 19" above floor and should be equipped with a horizontal handrail.

c. Lavatories with narrow aprons, mounted at a height of 30" from the underside of apron to the floor. Plumbing should be placed high under lavatory to avoid legs and chair. Hot water and drain pipes should be insulated.

d. Hand dryer should be set at a 40" maximum above the floor.

e. Mirror should be set no higher than 40" above the floor.

f. Circulation in public toilets should be carefully checked for use by handicapped in wheelchairs.

4. Miscellaneous Facilities

a. Public telephone should be wall mounted with acoustic side shield and should be mounted 30" above floor. (30" to underside of telephone shelf with pay phone on shelf.)

b. Food service areas should have tables with height 30" from the floor to underside of table. Cafeteria self-service areas should be adapted to wheelchair use.

c. Drinking fountains of standard free-standing type can be adapted for use by wheelchair occupant by placing a side mounted basin and bubbler 30" above grade. If wall mounted drinking fountains are used they must be set at a height of 30". Note: If drinking fountains are adapted to the 30" heights, a step for children may be omitted.

5. Educational Facilities

a. Weather Station: A complete weather station is extremely important in helping to interpret the weather. Information about establishing an officially approved type of weather field station can be obtained by writing the Weather Bureau, United States Department of Commerce, Washington, D.C. 20235.

b. Sundial: The basis of time and other facts in astronomy are illustrated by a sundial. Complete directions for constructing a sundial from scrap materials are available in Circular 402, Sundials, available at 5¢ from the U.S. Government Printing Office, Washington, D.C. 20402.

c. Bird Feeder: A bird feeding station and bath should be located near the Demonstration Center. The station should be placed so that the feeding area is visible from a window of the Center but screened from the remainder of the building by shrubs.

d. Animal Tracks: A paved walkway or patio near the Demonstration Center can show all types of native animal tracks imbedded in concrete patio slabs. Melted parafin is poured into a fresh track as it is found in nature. When the parafin cools, a three-dimensional copy of the animal's foot is removed. This east is pushed into the surface of a freshly made cement mix to produce realistic footprint of the animal.

e. Tree Stump and Log: A stump and split log display can be placed near the Demonstration Center or on the trail. A sloping cut on top of a tree stump or a section from a large tree trunk is smoothed and waterproofed. A log can be "planted" if a suitable stump is not available in the proper place. The annual rings of growth can be matched with local historic events that took place during the tree's lifetime. The list of events with dates can be placed on the stump. A split-section of a log also can be placed nearby to show more about tree growth and how the grain of wood is caused by structures resulting from growth. (See Figure 5)

Stumps and log sections are especially prone to severe, even ruinous cracking, to rotting, and to insect attack. A simple method of eliminating much of this difficulty is by repeatedly painting the wooden articles for display as soon as they are cut with Polyglycol E 1000 (Dow Chemical) and Penta (Monsanto) solutions. The two preservatives should be used alternately with drying time between each application. This treatment should be applied to all wooden articles to be used outdoors, including benches, signs, or split logs.

f. Trail Entrance Sign: A sign at the entrance of a trail does much to set the stage and have visitors get the maximum return for their time by presenting the following:

(1) Map of trail system with length of each section given to a fraction of a mile.
(2) Location of special attractions on trails.
(3) Highlights of the week.
(4) Pictures of items to see.

The last two items are mounted on heavy waterproof cardboard and displayed in permanently mounted frames put on the sign for the purpose.

g. Provisions for the Blind: Staff who will be having contact with blind children should participate in a one-day institute on blindness and the orientation and mobility of blind children.

Special equipment that should be available to the blind include:

(1) A braille writer such as a Perkins Braille Writer (100, Howe Press, Perkins School for the Blind, Watertown, Mass.)

(2) An individual braille pocket slates ($.35 to $2.50, Howe Press or the American Printing House for the Blind, 1849 West Frankfort Avenue, Louisville, Kentucky).

(3) A small tape recorder for notetaking, and recording of bird calls.

(4) A braille compass.

(5) A braille ruler.

Printed materials that are available to the sighted should also be available to the blind in braille. A braille booklet describing the trail and what to look for along the trail would be helpful. It should include raised copies of leaves and other things featured on the trail.

It is not uncommon for the blind to have difficulty with spatial relationships. An acre laid out on the ground will greatly enhance this understanding of its size after having the opportunity to walk its extremities.

Nothing can substitute for the actual object to show the blind, but in some instances because of inaccessibility, small size, variance of seasons, etc. it is necessary to use replicas or models. Commercially made models have to be carefully evaluated as to their usefulness for the blind. Many are too small, detailed, or rely on visual clues making them useless as aids for blind children. The American Printing House for the Blind, 1839 Frankfort Avenue, Louisville, Kentucky, has started an evaluation project of educational materials and could be a source of information.

At best, there is a limited variety of models available and models unique to the proposed trail for the handicapped will have to be specially constructed. Many materials such as formation of twigs, leaf patterns, casts of animal paw prints, etc. can be reproduced on plastic paper to be placed into descriptive booklets. A list of some of these models that might be needed are as follows:

<u>Animals</u>

Stuffed birds and animals
Animal homes such as cross section of burrows
Animal paw prints
Fossils

<u>General Information</u>

Three-dimensional floor plan of Demonstration Center
Models showing a tour path
A model showing the relationship of forest, fields, and towns

Physical Science

Three-dimensional models showing how erosion effects different types of land
Models showing results of glacier movement

Plants

Flower parts
Leaf structures
Stem structures
Root structures and samples
Models of trees to compare size and shapes
Forest undergrowth

Virtually any nature arts and crafts project utilized with the sighted will be satisfactory for the blind child, such as seed pictures, plaster of Paris plaques made from pods, cones, etc. Projects involving painting over leaves on paper and then removing the leaves to show the outline can be adapted for the blind by using thick tempera paints which will leave a design that can be felt by the blind child. Collection of leaves, bark samples, and rocks can begin an interesting hobby for the blind child.

Many things pertaining to nature can be pointed out to sighted children which are often lost to the blind. The child is limited to viewing objects close to the trail and ground. At times looking at a small portion of an object or an area does not give him a total picture of the object or area. Sometimes comparisons will want to be made such as differences involving seasons. With sighted children, this can be accomplished through photos, slides, or drawings. For the blind child, it is impossible for him to have ready access to the area, and to see the material in the outdoor setting, it will be necessary to have samples available. Below is a list of some of the materials that should be available along the trails or as samples in the visitor's center.

Tree bark and branches
Samples of wood in varying stages of decay
Samples of insect destruction
Feathers of different birds
Examples of soil texture
Samples of grasses and weeds
A variety of seeds, pods, and fruits
Leaf covering of soil
Various layers of soils
Moss and lichen growth on trees
Different types of rocks
Root systems
Wild herbs
Bird homes
Different types of materials used for building nests
Bird foods
Pieces of hard and soft woods of same size to compare texture, hardness, and weight
Cocoons
Animal homes

Cross section of tree sandblasted to emphasize the tree rings
Wild flower bulbs
Weather instruments
The tapping of maple trees
Recordings of bird calls, animal calls, and night sounds

## Conclusion

In conclusion, a specially adopted nature trail is one means for providing a rather unique open door experience for the handicapped who, all too often, have few doors open to them.

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